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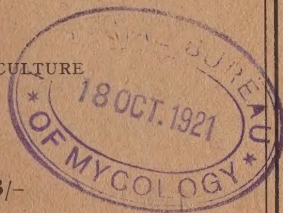
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EDITORIAL NOTES—FEBRUARY, 1920.

During the Great War, the usual working of many of our industries was seriously interfered with. And unfortunately the establishment of peace has not yet been followed by the restoration of normal conditions. Besides the effects of the war itself, certain minor causes have helped to continue the interference. The local influenza epidemic at the end of 1918, the strike in Australia early in 1919, added to the difficulties under which some of our industries were labouring, while of course the disorganisation of the labour supply has been severely felt by all. The recent Marine Engineers strike in Australia places a further burden upon some and affects all in some way or another. All these disabilities point to one matter which is of vast importance to every planter—the necessity for exercising the strictest economy in every part of the plantation work. One of the articles in this number is an address by the Superintendent of Agriculture on this subject at the Planters' Convention in August, 1918. The shortage of labour is now more acute than ever and the matter is therefore now more deserving of attention than in 1918. Figures for 1918 have been substituted for the 1917 ones used when the address was read.

Maize contains all the elements of a perfect food—protein, fat, and starch—while it contains less crude fibre than most cereals except rice. Whereas wheat contains 81.1 per cent. of digestible nutrients, maize contains 78.9 per cent., being greater than the amounts contained in rye, rice, barley, millet, oats, buckwheat. Hence it will be seen that maize occupies a high place in a list of cereals arranged in order of their value as foods. The grain can readily be ground in small hand-mills when it is then ready for cooking. It should be freshly ground, since in ground whole grain the oil contained in the germ decomposes on keeping and communicates an unpleasant flavour to the meal. Where corn meal is intended for keeping, the germs of the seeds are first removed. Some use of maize as food is being made by Indians during the present shortage of rice, but this cereal deserves to be much more generally used. It is a much shorter crop than rice and can often be grown when rice cannot. It is therefore specially valuable as an emergency crop.

The Blue Book for 1918 gives 51,266 as the number of horned cattle in the Colony, presumably at the end of the year, the figures used to give which total being supplied voluntarily by owners. There seems to be some doubt

as to the accuracy of the total number of stock given in the Blue Book. Estimates prepared by people who are in a position to know something of the matter vary from about 30,000 upwards, but do not reach 50,000 head. With the object of arriving at some accuracy, the co-operation of stock owners has been sought and forms have been issued for the purpose of taking a census of the stock in the Colony. Returns are now coming in and it is hoped that owners who have not yet sent in their returns will realise, at an early date, the importance of forwarding the information desired.

The Legislative Council on 16th February, 1920, approved of a sum not exceeding £500 being spent on the investigation at Tahiti and the introduction into Fiji of a parasite to control coconut scale.

Information as to the work of the parasite in Tahiti is as follows:—

“In Tahiti on most of the plantations the scale was found to be disappearing at a very rapid rate due to the work of the parasite *Aspidiotiphagus citrinus*. On some of the trees 50 to 75 per cent. of the scales were found to be dead; specimens of the scale, more or less badly parasitised, from six islands of the group were seen by the author, and it is thought that under normal conditions the parasite will soon have the scale well under control so that it will no longer be a menace to the coconut palms.”—*Experimental Station Record*, Washington, U.S.A., June, 1909.

Mr. H. W. Simmonds, F.E.S., who has been appointed to conduct the investigation, left for Tahiti, via Auckland, by the “Navua” on 19th February.

THE DEVELOPMENT OF CATTLE PRODUCTION IN FIJI.

A PRELIMINARY NOTE.

By WAKEFIELD RAINEY, Government Veterinary Officer.

It was my intention to postpone discussion of the matter with which this report is concerned until my tour of the group of islands had been completed and until I had obtained as full details as possible of the relation between the prices of live cattle and the retail prices of meat throughout the Colony.

Circumstances, however, have determined me not to wait for further details, but to publish, now, views and impressions which these details can only serve to confirm and to substantiate.

I was aware before coming to Fiji that there was a growing opinion that the production of cattle in the Colony ought to be considerably developed, both on its own account and because it might replace to some extent other industries which by reason of labour and transport difficulties were either not progressing or were tending to diminish.

I foresaw then that my responsibility would be two-fold, partly as a veterinary practitioner to take measures for the control and prevention of cattle diseases, and partly as an organiser to collate evidence on the subject of cattle production generally, and to deduce from that evidence concrete conclusions designed to point the way to progress.

Already it is evident to me that from a purely veterinary aspect little is required of me. There exists in the Colony, so far as I have ascertained, no important disease of cattle except tuberculosis; and that disease is not so prevalent or virulent in Fiji as to constitute, with those reasonable precautions which I have elsewhere described, any serious hindrance to the development of the cattle industry.

On the other hand I perceive plainly that from the economic or commercial standpoint there is much to be accomplished before the business of raising and fattening cattle in Fiji can be placed on even approximately the same prosperous basis as in other countries.

The evidence before me is to the effect that until very recently the average price paid for fat cattle by butchers in Fiji was £6, and that at the present time the price paid is not enough to encourage growers. The prices paid to-day vary considerably in different parts of the Colony and to different sellers.

My information is to the effect that the Colonial Sugar Refining Company, at Lautoka pays 25s. per cwt. for the dressed carcase, *i.e.*, £7 for a prime bullock of fair size.

A similar bullock in Australia would fetch about £18.

At Suva the price paid varies greatly with the contracts made with different sellers, namely, from £7 to £10 a beast; my information is to the effect that the price as a rule is more nearly £7 than £10. Now those prices at the present time, having in view the cost of labour and the reduced value of money, are a grave anachronism.

I will state frankly my opinion that at these prices cattle production as a self-supporting industry does not offer a fair living to anyone except a butcher. As compared with other countries the retail prices of meat in Fiji are low, but when considered in conjunction with the prices paid to the planter for live cattle they are high.

At a rough estimate the price paid by the butcher in Fiji to the planter for prime bullocks is (weight for weight) less than half the price paid in Auckland or Sydney; whereas according to my information the retail prices of meat do not greatly differ.

At first sight it would appear therefore that the gross profits of the meat industry in Suva are 100 per cent. greater than those of the industry in Sydney, but in fairness to the argument it is necessary to point out that this may not be the case.

In cities like Sydney where there is a large population of European labourers there is a ready sale for the coarser cuts or odds and ends of beef at a fair price. In small tropical communities like that of Suva where the Europeans as a rule adopt a higher standard of living there is a brisk demand for the best cuts of beef, but there is not a correspondingly good sale for the rougher meat and bones.

Consequently this rougher meat is sold at a lower rate to the native population, a circumstance that makes a considerable difference in the gross profits of the butcher.

In our estimate of gross profits then we must allow 25 per cent. for this factor; I do not believe it is necessary to allow more.

We thus conclude that the profits of butchering in Fiji are in the gross about 75 per cent. higher than in Australia at the present time.

It is hardly possible to estimate with any hope of accuracy the difference in net profits unless we produce the detailed figures of the retail trade in both Australia and Fiji, but it may reasonably be assumed that in a White Australia the cost of conducting a butchering business, large enough to require the employment of skilled labour, is not (other things being equal) less than in Fiji.

Consequently we may proceed with our consideration on the assumption that the retail meat trade in Fiji is on the whole about 75 per cent. more profitable than in Australia; provided that the business concerned is competently conducted in all respects, and is established in a reasonably populous centre, with opportunities of supplementing the local trade by provisioning ships, and fulfilling contracts.

Up to the present time this high rate of profit has in my opinion been to a large extent justified, because it has enabled the principal butchers in Fiji to organise and consolidate their businesses, and to undertake many enterprises of great value to the development of the meat trade in the Pacific.

I believe, however, that the time has now arrived when the butchers must be content to divide the profits fairly with the grower of the cattle.

The needful thing is not to reduce the retail prices of meat (they are in comparison with other countries fair and reasonable), but to increase the price paid to the planter for prime bullocks.

If, at Lautoka for instance, it can be shown beyond doubt that the retail prices of meat are too low for the butcher to pay more for cattle, having in view the small size of the European community, then in such a place I would advise that the retail prices of meat be raised enough to admit of the payment to the planter of an adequate price for his prime bullocks.

My opinion is that growers must be paid for their fat cattle at the rate of 40s. per 100 lbs. (dead weight), if the business of cattle production in Fiji is to be put on a proper basis at the present time, on the condition that only prime bullocks are paid for at this rate. A less rate would be paid for beasts other than prime bullocks.

The grading of slaughter-cattle so that the best turned out beef fetched the top price is a factor of great importance in the improvement of cattle-farming generally.

There is nothing more disheartening to a keen breeder or grazier than the present system of purchase of slaughter-bullocks at so much a head or so much per 100 lbs. irrespective of quality or "finish." There is under these conditions no incentive to produce really prime beef; so long as they are on the whole just fat enough to kill, and just big enough to satisfy the butcher, off go the cattle to the slaughter-yards with no advantage in the transaction except a fleeting material gain to the seller or buyer.

That is not the spirit in which to establish or improve an industry; there must be an enthusiasm, a boasting of the seller in the market-place, a pastoral pride in fatness and bulk, circumstances of far greater importance than a score of Stock Improvement Ordinances.

I would protest earnestly against preferential treatment of individual planters. A prime bullock is a prime bullock and should be paid for accordingly; the value of the animal sold should form the sole basis of the transaction, and open market publicity should be given to what is essentially a public matter.

It has been stated that the meat supply of Fiji is in danger and consequently that the export of cattle should be prohibited. My reply to that statement is that curative efforts should be directed to the cause and not to the effect of a trouble of this sort; that a very serious danger indeed threatens the beef supply of Fiji, namely, the murder of an industry in its infancy by a powerful and highly intelligent trade monopoly; and that so soon as means are taken to ensure a good price for prime bullocks, that danger will pass away and be heard of no more. I would go further and say that unless the cattle industry is fostered or stimulated by the means indicated in this memorandum there will at no distant date be no more prime bullocks to export; and that unless an export business can be built up (whether of live cattle or manufactured beef-products), the Colony so far as the cattle industry is concerned will not prosper as she has a right to prosper with her natural advantages for the production of beef. It is my intention to return to this subject later on, and only to say enough now to encourage a discussion on this vital matter.

It is difficult in a small community like that of Fiji to criticise an industry or trade without incurring a suspicion of personal attack, but I sincerely trust that no intention of this kind will be imputed to me.

Men with practical experience of life and affairs readily acknowledge that enterprise deserves to be rewarded in proportion to the difficulties and risks involved, and I would dissociate myself from any charge of profiteering against the butchers of Fiji.

My contention at most is that to some extent the trade has had its innings and that the other side should now be invited to take a hand at batting.

It is better for the Colony that there should be a hundred solvent prosperous graziers, than that there should be one prosperous butcher, however public spirited he may be.

If I have shown a way to help the planters and thereby the Colony without impoverishing the butcher, the sole object of my representations will have been secured.

ECONOMY IN LABOUR ON THE PLANTATION.

AN ADDRESS BY THE SUPERINTENDENT OF AGRICULTURE AT THE PLANTERS' CONVENTION IN AUGUST, 1918.

An American writer, commenting upon the necessity for economy in labour, makes the following remark:—"Instead of being a great drawback to industrial expansion, the scarcity of labour has been its greatest stimulus and a blessing not only to America but to the whole world, because it has been the incentive for the development of labour-saving tools."

The reference here is to industries of great manufacturing countries, but it is not impossible that similar results might follow a shortage of labour in a small agricultural country, by the encouragement of better, and therefore more economical methods, or the substitution of more paying crops. With a fairly plentiful supply of labour, such as Fiji has hitherto enjoyed, there was not so much necessity for economy in labour, although naturally every employer tried to get each unit to do a full task. The largest part of the cost of tropical agricultural produce is the labour bill, hence it is the most likely place where waste may take place. Waste is possible, too, in other directions and due consideration must be given to every factor that can influence a crop. For instance it would be of little benefit to be extra careful in the supervision of labour on a crop planted on unsuitable land, at the wrong season or with perished seed.

The writer referred to above points out that in countries where the labour is entirely what we should call European, the prevention of waste of human labour is not only an economic gain but it has lightened the drudgery and added intellectual stimulus. The value of the regular labourer is now determined by his skill and ability, his honesty and reliability rather than by his brute force. I do not know what amount of intellectual stimulus would result to the average Indian labourer by the substitution of machinery wherever possible for manual labour, but our immediate need is to effect the economy—the results on the labourers, though possibly of great interest, will not have any effect at the moment.

Ploughing, as an instance of the replacement of hand work by machines, has become an art, and the numerous modern ploughs call for judgment and skill on the part of the user, rather than actual bodily strength.

Planting can never be so well organised as manufacturing industries, and the planter will always have to contend with many forces and conditions which cannot be controlled by anyone, no matter how skilled he may be. The planter must therefore take care that every point, where wastage can be controlled, is given the necessary attention.

The effect of a reduction in the labour supply will certainly be a reduction in the area operated upon. With the class of labour we have at present, the amount of effective work performed depends largely on the effectiveness of the supervision. It is possible therefore that a reduction in the labour supply may confer some benefit to some industries since the efforts of the person superintending operations will be concentrated upon a smaller area, which should result in better work from the labourers.

The crop itself should be carefully considered, for it may be possible to find a more remunerative one. This remark of course applies to those not engaged in the cultivation of permanent plants.

In these days of scarcity of shipping the first endeavour should be to supply whatever we can of our own wants. A number of articles appears

in the list of imports which can be grown in Fiji. It may be put forward that these articles are produced in countries where labour is much cheaper than in Fiji, and they should therefore be imported at less cost than that of growing here. This, however, certainly does not hold good for many of the articles and I doubt whether at the present abnormal freight rates it is correct for any of them, provided of course the production is carried out on proper lines. In the following table taken from the 1918 Blue Book, the invoice values and the local values at the present time are given:—

Article.	Quantity. imported.	Invoice value.	Local rate.	Value.
		£		£
Butter	132,033 lbs.	10,970	2/3 lb.	14,854
Ghee	165,868 lbs.	7,877	3/- lb.	24,880
Coffee and Chicory ..	12,722 lbs.	873	2/- lb.	1,272
Dhal	334 tons	3,033	-/5 lb.	15,585
Kava	104,744 lbs.	4,396	1/3 lb.	6,547
Coconut Oil	5,537 galls.	1,169	10/- gall.	2,768
Mustard Oil	36,998 galls.	7,508	15/- gall.	27,748
Rice	1,670 tons	24,430	-/3 lb.	45,090
Spices	98,476 lbs.	2,001	1/- lb.	4,924
Total				£143,668

Of this large sum, a great part leaves the Colony. And this total given above does not exhaust the possibilities of local products taking the place of imports. Large quantities of potatoes and onions are imported and also of tinned and frozen meat. The cattle industry must certainly develop, and potatoes have quite reached the stage of an industry in the Sigatoka district. Even if potatoes could not be grown, there are local articles which might well replace them, such for example as the small yam known as the Kawai. It can be grown almost anywhere in the group and is an excellent substitute for the potato. Seemann in his work *Flora Vitiensis*, speaks of the Kawai in the following terms:—"..... Altogether the Kawai may be pronounced one of the finest esculent roots in the world and I strongly recommend its cultivation in those parts of the tropics still without it." And I should like to recommend strongly its extended cultivation in Fiji.

It may be thought that I am wandering from the question of economy of labour, but I think you must agree that any consideration which enables better results to be obtained from a fixed expenditure on labour is a matter of economy. The selection of a remunerative crop is certainly the first consideration.

On deciding on a crop, the surroundings which cannot be altered to suit a particular crop must be the chief guide, and then care must be taken to see that conditions which can be altered, are made to suit the crop chosen.

Where annual crops are grown it is possible to effect improvements in the crop itself. The selection of seed is of the highest importance. The plant takes its character from the seed and if in ordinary times it is advisable to be careful in the selection of seed, how much more important is it when, owing to a restricted labour supply, it is necessary to get absolutely the best

results! It requires about the same labour to plant and cultivate an acre of a crop whether the yield is very poor or very good. Hence too much care cannot be given to the selection of seed or plants.

The use of mechanical appliances to replace hand labour is naturally a point which permits considerable economy of labour, but care must be taken that such appliances are mechanically efficient. Then it must be ascertained that the work contemplated is necessary, and that it is efficiently carried out and at a suitable time.

Since large parts of the large islands of this group are in the "wet zone," I would specially direct your attention to drainage which in my opinion cannot be over-done. Indeed I consider that there is exceedingly little land which cannot be improved, and economy thereby effected, by better drainage. It is not sufficient merely to dig big drains, they must be designed in accordance with the run of the land, and must be sufficient, both in number and size, properly constructed and maintained in working order.

There are many small items involving the expenditure of labour where waste may take place apart from the operations connected with field work. For instance it is quite the usual practice for sacks of copra to be filled from the heap of copra by hand, the bag being placed on a frame with its mouth open into which the labourer shovels the copra which he takes from the edges of the heap and nearly all at ground level. All this might be saved by allowing the copra to run into the bags from the heap. In America the very rapid loading of large steamers with grain is possible only because of the use of elevators where grain is collected, treated, and stored. Use is made of the fact that produce in small pieces will run like a liquid from a high level to a lower one. Copra when on the *vatas* or, as we may soon hope to see, in the drying chambers, is at some elevation above the ground. The energy due to the elevation should be made use of in filling the bags. This would be more readily given effect to if the copra store itself was well above ground level unless advantage could be taken of some natural rise in the ground. The use of shoots, too, is likely to admit of the conveyance of copra from the dryer to the store-room in an economical manner. The Indian is a man of a somewhat primitive mind and he seems to prefer to use a knife sitting down if possible when cutting grass rather than to make use of a scythe, and I believe he would sooner carry material like copra in a bag than push it in a wheel-barrow. A considerable saving in labour could be effected if these men could be induced to use better methods.

I have heard a planter say that he does not mind how much his labour bill comes to when it is for reaping a crop, but that money paid out for weeding always provokes a feeling of annoyance. It is regrettable that there are such things as weeds, but since there are, they must be dealt with vigorously.

Some rather successful results have been obtained lately with a weed-killer on an estate near Suva and at Nasinu. I think this matter might receive more general consideration. The material is a compound of arsenic obtained by boiling white arsenic in a solution of washing soda. It takes about twenty minutes to prepare a batch of solution. The proportion is 1 lb. of white arsenic, 2 lbs. of soda boiled in 1 gallon of water and then diluted for use to from 10 to 15 gallons. A strength of 1-12 gives fair results, but for strongly growing weeds 1-10 is better. Arsenic costs about 1s. per lb. and soda about 3d. per lb. Allowing 2d. for boiling and dilution, the cost is about 1s. 5d. for 10-12 gallons. How far this will go is of course to be decided by the condition of the weeds to which it is to be applied. The wash is sprayed over the surface of the weeds in the form of a fine mist.

It should be done in dry weather. The action is that the poisonous salt gets absorbed by the leaves and passes down into the plant tissue through the vascular system, killing off the tissues as it reaches them. Tall Para grass, high *Clidemia hirta*, and other noxious weeds have been dealt with with some success. It is not recommended as a possible solution of the weed difficulty in every case, but in some cases its use would be found to be satisfactory. One advantage is that there is a great saving in labour. A man spraying with a knapsack machine would cover a width of about 6 feet and at this rate he would have to walk only $1\frac{3}{8}$ miles to cover an acre. He should therefore be able to do a few acres in a day and thus replace the work of several men. The use of this wash is specially valuable as treatment previous to burning, because the large amount of dry dead matter resulting from the action of the poison produces an excellent condition for a good burn. As to the effects of the wash on the land, it is recorded that in California arsenical weed-killer was the only method employed on one estate for dealing with weeds, and had been so for over twenty-five years, without any appreciable effect on the permanent plants on the land. In a rubber plantation in Hawaii, this weed-killer has been used among rubber for several years and so far no ill effects have been observed.

To revert for a moment to a matter connected with the copra industry, I am certain that the use of artificial dryers for the preparation of copra will economise labour and by enabling an uniform grade of product to be turned out, will give rise to increased returns to the planter. The kernel of the coconut when freshly opened is a perfectly pure material and it seems a pity that it should not be kept in that condition so far as is practicable. During its exposure, lasting, when sun-drying is used, some days and especially during the earlier part of that exposure, every mould spore, which falls on it, grows and takes away some valuable matter. I have in my office some samples of copra which have been very materially reduced in thickness by the growth of mould, and the total loss must be considerable.

In the case of goods of a perishable nature, certain losses are unavoidable in the handling. I am inclined to think that better results are likely to be obtained by concentrating attention upon a smaller quantity of perishable goods such as bananas. In these days of high freights, care should be taken that everything sent away is of first-class quality. All rejected produce represents a waste of labour. We learn from the American Department of Agriculture Yearbook for 1908, that in America, as a step in economy in marketing produce, farmers have organised co-operative warehouses and other trading facilities and have suggested and even demanded legislation to control grading of their produce.

In some of our industries, I am not sure that there is not an opening for the introduction of some co-operative system which would reduce individual marketing expenses, and in some cases the selling expenses, in the country to which the produce is exported.

Cannot a saving be made in the animals employed about a plantation as well as in regard to the plants grown and the labour used? One horse may require twice as much food as another to keep up a given working efficiency. One cow converts her food into milk another into flesh, one produces twice as much milk or flesh as another from the same amount of food.

It is well known that one banana plant will give a 9-hand bunch, while next to it under the same conditions a plant produces only a 5-hand bunch. One coconut palm gives eighty nuts a year, while next to it an apparently equally healthy palm gives only twenty. The plant or animal of low efficiency may be grown or kept at a very small profit or even at a loss,

while that of high efficiency costing only the same on the plantation gives a considerable profit.

Machines and tools as well as animals which cannot be kept fully employed during what are supposed to be their ordinary working hours are sources of waste.

I will mention only one more point which may involve a waste of labour and that is the loss which arises out of diseases of plants.

Much labour may be spent on a crop which then becomes attacked by some disease or pest and the whole of the labour spent will be wasted. Each attack must be dealt with in the proper manner, but indeed in some cases satisfactory remedies are difficult of application. Since every outbreak of pest or disease may involve a great loss to others besides the owner of the place where such attack may first be noticed, I would point out the importance of attention being called to the presence of any suspicious insect on the plants or to any curious or abnormal condition of the plants, so that the matter may be properly investigated. In America (I mention America so often because it is a country where agricultural matters are so well organised and where reliable statistics are available), in America, it is calculated that as a general average, not less than 10 per cent. of the principal agricultural and horticultural crops is annually destroyed by disease and a similar percentage by insects. To indicate the scale of agricultural operations there it may be mentioned that that country *exports* something like three thousand millions of pounds of cotton and over a hundred million bushels of maize, so the total value of the losses must be enormous. The proportion of loss is certainly not likely to be less in tropical countries such as Fiji where the knowledge of the diseases and pests of cultivated crops has not reached so advanced a stage as in countries where vast sums are spent on agricultural investigations.

REPORT ON VETERINARY INSPECTION AT MAKOGAI.

By WAKEFIELD RAINEY, Government Veterinary Officer.

In compliance with instructions from the Superintendent of Agriculture, which reached me at Taviuni, I proceeded to Makogai from Levuka by Government launch on the morning of 27th October, and departed from Makogai to Levuka by Government launch on the morning of 29th October.

The afternoon of 27th October and the whole of 28th October were occupied in a close investigation of all matters affecting stock.

The stock on the island with the exception of six cattle and two ponies (private property of Dr. Hall) are the property of the Government and comprises:—

Cows in milk	..	..	..	..	..	..	16
Cows dry with bull	..	..	..	..	..	..	14
Bull (Shorthorn)	..	..	..	..	..	..	1
Heifers	..	..	..	..	..	..	16
Steers..	..	..	..	..	..	..	35
Working bullocks	..	..	..	..	..	..	4
Imported " fat cattle " awaiting slaughter for meat	..	..	..	..	..	..	12
Ponies	..	..	..	..	..	..	2
Mules	..	..	..	..	..	..	2
Pigs (one boar three sows)	..	..	..	..	..	..	4
							106

With the exception of about twenty of the steers which were ill-grown and in varying condition in consequence of being run on bad grazing land, the stock were in excellent condition and well cared for.

There was no evidence whatever of any disease among the stock; I attribute this to the generous feeding and special care of the breeding herd, and regard the circumstance as evidence in support of my opinion that if cattle are well fed and cared for in Fiji, tuberculosis will soon cease to be troublesome.

" Fat cattle " for meat are imported from time to time from Vanualevu and tuberculosis has been found among these cattle on arrival or after slaughter, but the measures of precaution taken by Dr. Hall have effectually prevented the spread of infection to the Government herd on Makogai.

I saw that there was no degeneration among female stock of the third generation bred on Makogai; this is important testimony to the soundness of the feeding methods adopted.

The degeneration of the steers is attributable to the fact that the policy of Dr. Hall has been to feed the breeding stock well and to let the steers fare as best they can on the rough land of the island, because it has not been possible to plant enough *paspalum* paddocks or grow enough hand feed for the steers as well as the breeding and working stock.

I inspected the private cows, calves, and ponies, which Dr. Hall is offering for sale to the Government, and hereby certify that the animals are in excellent condition, are free from disease, and that the prices asked are fair and reasonable.

The method of breeding adopted is as follows:—The mature female stock is divided into two lots, namely, about 16 cows in milk, and about 14 cows dry with the bull. When a cow calves she is drafted into the milking mob and left there away from the bull until she has been milking for six months. At the end of the six months she is dried-off and returned to the mob with the bull where in due course she is served and becomes in calf. By this method each cow loses about four milking months at each calving, but against this must be set the great value of the physiological rest to the cow, a very important point under tropical conditions, and one which deserves further trial in Fiji.

FEEDING OF STOCK.

The arrangements for feeding stock are truly admirable. The island in its natural state is barren and unproductive for grazing, but by means of diligent planting, and culture of sorghum and other fodder crops, it has been found possible to maintain all the breeding stock in excellent tip-top condition, in addition to the cattle awaiting slaughter and the working animals. An important item in the feeding arrangements is the manufacture of copra-residue cake by means of a simple oil-pressing plant. The copra is cut up in a machine driven from the steam engine used for pumping water, and the oil is pressed out by means of a crude hydraulic press.

The oil is used for making soap, and the copra residue is mixed with a little molasses to form a simple "cake."

The machinery is so poor that only a limited amount can be made, barely enough to give each milking cow 1 lb. of "cake" daily, but the effect on the cows is evident, and with better machinery much more might be done. It has been remarked above that about twenty of the "steers" were in varying condition on account of food being not available for them as well as the breeding stock, but I am of opinion that Dr. Hall may have been too conservative as regards the breeding stock: I think that some of the breeding stock were too fat, and that a better allocation of food and grazing might be made so as to give the steers more and the cows a little less.

Details of the cultivation of the land are:—

	Acres.
Land under sorghum and Indian cane	6
Paddocks planted with paspalum at Nasau	40
Paddocks planted with paspalum at Takewa	15
With sensitive grass	30
Natural grass paddocks at Takewa about	100

At first sight this seems a generous provision for a relatively small herd, but the land is sterile and the crops are scanty with the exception of the hand feed tillage which is well manured.

It was interesting to observe the extraordinary effect of the application of sulphate of ammonia experimentally to an exceptionally poor paddock of paspalum; the parts manured with the ammonia sulphate were growing a rich heavy crop.

In addition to the above paddocks there is about 1,000 acres of scrub or bush where the steers run, but the feeding does not exist in this bush for development or maintenance of stock, and it would be as well to avoid it altogether until more of it can be reclaimed by planting with paspalum. Dr. Hall is of opinion that the steers born in the herd cannot be profitably reared on the available feeding, and should be slaughtered at six months for meat. Although I believe that a proportion at least of the steers might be reared under good management by a better distribution of the available

feed, nevertheless because it is not likely that the required first-class management will in future be available, I support Dr. Hall in this policy and recommend that all steers should be killed and eaten as veal at six months.

In this way a substantial margin of food will be secured for the breeding and milking herd, and for the adequate development of the young heifers, for the fattening off of old cows, and for the maintenance of imported fat cattle awaiting slaughter.

WATERING.

At Nasau the water is pumped by an engine from a well, and at another place there is a hand pump supplying a tank with a ball cock feed to a trough. At Takewa the water supply is from a mud dam.

The arrangements are adequate but require systematic attention such as has been given them by Dr. Hall.

GENERAL MANAGEMENT.

This leaves nothing to be desired. The various mobs of cattle are kept in their appointed bounds by excellent fences and gates; the fodder is fed in excellent troughs, and the calves are weaned properly at six months.

CONCLUDING REMARKS.

I would place on record my warm praise of the work done by Dr. Hall for the care of the stock and the building up of a clean vigorous herd of milch cattle, from very moderate material.

It is a fine example of what can be done in Fiji on relatively unproductive ground where labour is available to carry out good farming under close personal supervision.

The entire freedom from disease of any sort in a herd of breeding and dairy cattle during several years could be secured in no other part of the world with which I am personally acquainted, and this is an ideal worthy of considerable effort on economical grounds alone.



REPORT ON THE VETERINARY INSPECTION OF DAIRIES AND CATTLE IN THE SANITARY DISTRICT OF SUVA.

The veterinary inspection of dairies and cattle generally in the neighbourhood of Suva has been carried out as opportunity has offered since 1st October, 1919, and may now be considered to be practically completed. Most of the inspections have been made in conjunction with Mr. McNair, the Sanitary Inspector to the Central Board of Health, who has been of the greatest assistance to me in the matter.

STATISTICS.

Twenty-two dairies, comprising about 337 cows, 16 bulls, and a large number of calves, have been visited. In addition, nearly 1,000 cattle the property of other than registered dairy proprietors have been inspected on lands within a few miles of Suva.

DISEASES.

I could not find very much evidence of tuberculosis or other microbic disease among the stock. The Indian dairy holdings were remarkably free from any appearance of tuberculosis; it was only necessary to order one cow to be destroyed on account of this disease in the course of a careful examination of the 337 milking animals presented for inspection. The destruction of this cow was carried out by me and £3 was paid as compensation to the Indian owner.

Orders were given for the destruction of two calves suffering from a form of dysentery.

Evidence of tuberculosis was found in certain herds of cows owned by Europeans, but except in one small herd the proportion of affected animals was small.

By agreement with the owners, all suspected cases of tuberculosis were slaughtered and no claim for compensation was made. Of microbic disease other than tuberculosis and diarrhoea in calves there appears to be none, and I would remind the owners of stock of their good fortune in this respect.

Contagious abortion, milk fever, mammitis, difficult parturition, red water, and other diseases, which are a constant cause of trouble and loss in Europe and other countries, are almost unknown in Fiji, where it is only necessary to take reasonable precautions against tuberculosis and to give the stock sufficient food and water of reasonable quality to secure almost perfect conditions of health.

Unfortunately the humane and economic obligation to feed well appears to be hardly recognised, with the result that disease arising from malnutrition occurs among the stock, and causes unnecessary trouble to the owners as well as suffering to the animals.

The value of stock inspection is exemplified in the scarcity of tuberculosis among the Indian dairy cattle as compared with the non-dairy European-owned herds which have not been subject to any inspection.

The conditions under which the Indian dairy cattle are necessarily at present kept are favourable to tuberculosis, but because the animals have been frequently inspected and the obviously diseased cows have been eliminated, the herds are on the whole remarkably free from this disease.

GRAZING AND FODDER.

The land in the neighbourhood of Suva in its natural state is not good grazing land and, even when planted with good grasses or fodder plants, does not appear to be productive. I am of opinion that without scientific manuring the grazing land as a whole will not properly maintain breeding cows with their calves at a closer rate than one cow to three acres.

On some holdings where an attempt was being made to run mixed mobs of cattle without hand feeding at a closer rate than one beast to three acres the stock were emaciated and the calves were exceedingly ill-developed.

TYPES OF CATTLE.

The prevailing type is a cross bred, more or less degenerate beast, of European origin, showing inheritance from any of the following strains:—Shorthorn, Polled Angus, Holstein, Jersey, and Ayrshire. In one herd there was a considerable number of cattle showing varying degrees of Zebu crossing. No evidence of any sort of disease was found among these "half-breeds"; moreover, although the land on which they were running was over-stocked, they had developed and retained their condition far better than had other cattle of pure European extraction which were grazing on the same land.

THE STOCK IMPROVEMENT ORDINANCE OF 1909 IN RELATION TO THE DAIRIES.

Most of the bulls inspected were of poor quality and it was necessary to order the castration of a few young animals that were being kept to serve as bulls when they should have reached maturity. It was not practicable, however, to carry out the provisions of the Stock Ordinance with respect to several undesirable animals, because the conditions of the industry are such that the dairyman cannot afford to buy better animals.

If it is suggested to establish Government owned bulls in the Suva district for the use of the poorer stock owners, I would point out that under existing economic conditions it would be a waste of money. It is useless to attempt the improvement of stock by introducing thoroughbred blood, unless the resulting young stock are well fed, because well-bred animals would be less able to endure the conditions of semi-starvation to which reference has been made.

THE MILK SUPPLY OF SUVA.

From general observations I would now turn to a detailed consideration of the milk supply of Suva from a veterinary and economic aspect. The fresh milk supply of Suva is derived in part from privately owned cows and in part from cows in the management of registered dairy proprietors who, with two exceptions, are Indians. The milk from privately owned cows may be assumed to be satisfactory. These animals are usually well fed and of a better type than the general run of cows in Fiji, and those tests of the milk which are recorded in the office of the Medical Officer of Health show that the percentage of butter fat is up to the normal standard.

The following remarks, therefore, are applicable chiefly to the public milk supply on which are dependant those people whose circumstances prevent them from keeping private cows, a class of consumers that tends to increase in number so long as a town continues to grow.

It should be unnecessary to refer to the great importance of securing for a growing town a public milk supply free in all respects from reproach, but experience elsewhere has shown the advisability of reminding a community that milk is a staple food for which nothing can safely be substituted in the diet of young children and invalids.

In the diet of healthy adults the insufficiency of a particular article of food is of little importance, because another may be substituted with no adverse effect on nutrition, but so far there has been discovered no food, or combination of foods, capable of entirely replacing fresh milk for children and invalids.

Three qualities are required of milk:—

- (1) Cleanliness.
- (2) Freedom from germs of disease.
- (3) A sufficient content of fat and solids other than fat.

Conditions Nos. 1 and 2, are fairly well met in the milk supplied from the registered dairies in the Suva district. Although it has not been possible, for reasons very plain to those who have made themselves personally acquainted with the conditions of working, to give literal effect to the ingenious and detailed By-laws respecting dairies, published on 30th December, 1913, under section 75 of Ordinance No. XXVIII of 1911, nevertheless the broad principles of cleanliness and sanitation are observed. The extreme rareness in Fiji of tuberculosis of the udder is a very satisfactory circumstance, greatly lessening the chance of contamination of the milk with tubercular material, so that the risk of infection of human beings with tubercular bacilli of bovine origin may be considered to be exceedingly small.

Up to the present time after examining many thousands of cattle in Fiji I have only discovered one case of tuberculosis of the udder. In my opinion the rarity of this lesion is attributable to the fact that inflammation of the udder (a common ailment in colder climates) seldom occurs in Fiji, so that there is lacking the cause which in a more variable climate determines the selection of the udder by the tubercle bacillus as a site for its growth and spread.

Condition No. 3 on the whole is not met. I am able to state that milk containing the minimum of 3 per cent. of butter fat required by the By-laws of the Central Board of Health is exceptional, and that milk containing less than that percentage is the rule.

This fact is generally recognised by the people of Suva who often attribute it to adulteration of the milk by the addition of water. Be this as it may, my observations are to the effect that it would be difficult as a rule to obtain milk of the required standard from cows kept under the conditions prevailing in the Indian dairies.

Among the 337 cows examined by me very few were in fair condition, fewer still were in good condition; the majority were poor, to emaciation.

The pastures on which they lived were as a rule either grazed bare, or were composed of rushes and attenuated bitter grasses, which even a degree of starvation could hardly induce the cows to eat.

I am satisfied that most of the dairymen are hard working men, anxious to do the best they can to produce milk under most difficult conditions; I saw no evidence of deliberate neglect.

So far as their time and strength and the facilities afforded by their land permit, they cultivate para grass to supplement the poor grazing.

To obtain milk having the requisite percentage of butter fat and solids not fat, it would be necessary on the dairy holdings in the Suva district to increase considerably the grazing area per cow, and in addition on most of the holdings to feed liberally with para grass or bran.

It appears to me that no dairyman in this district could carry out these measures for the following reasons:—

- (1) The annual rent of the land in question is on an average £1 an acre.
- (2) The amount of available grazing land is limited.
- (3) The individual holdings are so small that, taking into consideration the amount of the rent, the badness of the land, the retail price of milk, and the high price of wheat, offals, or grain, the dairyman cannot afford to buy concentrated food or to pay labour to cultivate para grass. His own time is fully occupied in milking and in distributing milk.

These conditions, having always in view the poor quality of the land, are economically opposed to the production of good milk, and are incompatible with the carrying out of legislation designed to enforce a certain standard of butter fat and other solids.

It would not only be useless, it would be foolish, to proceed against a dairyman for supplying milk below the standard, unless the business of producing milk is capable of giving a living under the existing conditions to a man prepared to produce milk of the required standard. If the By-laws respecting the sale of milk are carried out, every Indian dairyman in the Sanitary District of Suva must shortly withdraw from business and, under existing conditions the public milk supply of Suva must cease to be.

To be able to enforce the By-laws, and it is desirable that this should be done, it would be necessary so to alter the present conditions as to make it possible on economic grounds for the dairymen to feed their cows adequately.

Given such improved economic conditions, the business of milk supplying in the Suva district would become reasonably profitable, so that it would be practicable to say to a dairyman: "Either you must produce milk of the required standard or we shall proceed against you under the By-laws."

The man to whom that is said, fearing for the loss of a reasonably profitable business, would make every effort to secure enough food for his cows, or would reduce their number to a point where they could be properly nourished.

How then can the conditions be improved?

Even if land owners were found philanthropic enough to reduce the rents to the grazing value of the land, which is probably less than 5s. an acre on most holdings, it is doubtful whether on the smaller holdings the desired effect could be secured, and such a step would not be in accordance with the laws of supply and demand. Suburban land has always a value higher than that of its purely pastoral productivity. For social or other reasons, land in the immediate neighbourhood of towns can command a higher rental than lands in rural districts, and it cannot be expected that the owners of the town lands should forego this advantage. To double the retail price of milk would make the dairyman's business susceptible of the necessary improvement, but it is hardly necessary to refer to the undesirability of doing anything to increase the cost of living if this can in any way be avoided.

If it is agreed then that neither of these measures is practicable, one can only conclude that some radical change from the existing state of affairs must be made, involving if necessary the scrapping of the dairy industry

of Suva as it is at present carried on; provided that the provision of an abundance of milk of good quality is considered to be a sufficient justification for the change.

The following proposal contains the outlines of a scheme that may ultimately solve the difficulty.

A PROPOSAL SCHEME FOR THE MILK SUPPLY OF SUVA.

I estimate that the public of Suva buy by retail at 4d. a quart, about 300 gallons of milk daily, or more broadly that the sale varies between 200 and 400 gallons daily.

Taking 300 gallons as the mean, the gross value of the industry is £20 daily, apart from the sale of cream or butter. On good land to produce daily 300 gallons of milk, would require at a maximum estimate 200 cows in full milk, or 400 cows altogether.

Within that large area of land which is bounded on the north by the Wainibokasi River, on the west by the Rewa River, and on the east and south by the sea, there are many thousands of acres of rich alluvial land heavily covered with self planted para grass and practically free from noxious weeds. This land of which for the most part no present use is being made offers several sites for a ready-made 800 acre stretch of grazing which, with fencing draining, &c., would suffice to maintain 400 cows in good condition.

Such a dairy farm could provide a rich milk supply for the whole of Suva, and I understand that with official sanction the land could be obtained for a small sum in respect of occupation, and a yearly rental of 1s. per acre.

The milk after cooling on the farm could be brought by motor-boat to Suva and put into a "cooler," thence to be distributed to the public by retailers whose remuneration would be one penny or at most two pence on each quart.

With the establishment at Suva under Sanitary conditions of a central milk depot the public demand for retail milk would grow, and the business of supplying ships with fresh milk would soon follow with important results to the development of the enterprise.

If at the central depot there is added, to the distribution of milk to retailers, the sale "over the counter" of cream and butter, a considerable subsidiary trade in these articles would be established.

It is not for me to say whether such an undertaking as I have outlined is more properly a matter for the municipality or for private enterprise, but I venture to express my belief that it would prove a profitable investment under capable management, and that sooner or later a scheme of the kind will be demanded by an enlightened public opinion.

EXTRACTS FROM REPORTS OF INSPECTORS.

COCONUT SCALE (*Aspidiotus species*).

Mr. M. A. Forsyth reports that from Levuka to Cawaci, on the east coast of Ovalau, very little scale was observed. Some infested trees had been dealt with so far as cutting off the leaves was concerned, but the leaves had not been burned. This latter was ordered to be done. From Cawaci to Rukuruku, scale was more frequent though nowhere bad. Some work had been done, but more was necessary, and instructions were issued accordingly. Catawara is practically free from scale since the palms have been treated. A fringe of coconuts adjoining the bush is infested and will be treated. The bush everywhere is full of scale.

At a neighbouring estate the palms are still badly infested in spite of the drastic treatment given. Nearly every tree is infested. The work is difficult and expensive, but a big effort is being made to cope with the attack. It is noticed that nuts are falling from the treated palms before they are mature and the output will be curtailed considerably. Further along, other plantations are still badly affected although much work has been done. The shortage of labour and the difficulty of the work make progress on big areas somewhat slow.

In the case of native owners, slowness in attending to the work was noticed and instructions were given for the completion of it.

At Wakaya work is progressing satisfactorily, and as the infested areas are not extensive, the spread of the pest should easily be prevented.

Mr. Forsyth observes that where the attacks of scale are most severe, want of drainage and other conditions unfavourable for the best development of the palms are to be noticed.

At Moturiki, a considerable amount of work has been done and work is in progress. At Nacabecabe the tall old trees have practically ceased to bear. The Inspector recommended thinning them out, which suggestion is being acted upon. There appears to be in most cases a real effort to comply with the Regulations, and in general these natives are showing more readiness to attend to their palms.

The scale on bush trees is very prevalent near badly attacked groves of palms, the following trees having been observed to carry the scale:—Kavika, ivi, wi, lauci, angona merisani, mango, kavakula, lidi, solata, and in addition to the trees, the bush yam tivoli.

NOOGOORA BURR.

Mr. F. W. Hennings reports as follows on a visit to Ba. Altogether 180 places were visited comprising 10 European plantations, 163 Indian lots, and the land of 7 Fijian towns.

Twelve orders were issued for the destruction of the weed and the places concerned were subsequently revisited when in all cases but one it was found that the work had been done to the satisfaction of the Inspector within the time specified in the order. In the one case where the weed had not been destroyed, the occupier of the land eradicated certain patches of the weed, but had not gone through his land to ascertain whether any more existed than the patches indicated by the Inspector. The remaining plants were however dealt with immediately.

The burr appears to have been confined chiefly to the upper part of the Ba River and to the hill land adjoining two European plantations lower down. Goats and cattle graze on this land, and are evidently the means of spreading the pest, while probably the working bullocks spread it through the Indian cultivations.

The small settlers appear to realise the importance of keeping the weed down.

RICE.

Mr. J. P. Tarby has completed a tour of the rice growing districts of Viti-levu except Rewa, and reports that on the north and west coasts the want of rain has prevented the usual amount of the earlier kinds of rice being planted up, while there is a danger that the later kinds may not give good crops for the same reason. It is therefore likely that there will be a considerable shortage of local rice in those districts.

At Navua the area under rice has been considerably extended and, given a normal rice season, there may be a surplus over the requirements of the district.

EXPORT OF FRUIT.

The Inspector of Produce reports that the shipment of bananas by the s.s. "Navua" on 17th January, to New Zealand, was 479 bunches and 15,775 cases, equivalent to 32,029 bunches. Rejections amounted to 6·7 per cent. of the shipment.

"A very good shipment of bananas, a perfectly wonderful change for the better has taken place in the quality of bananas during the last nine months. Scale has also decreased so that we often have considerable difficulty in finding specimens to decide if the fruit has been properly fumigated. In spite of the dreadfully inferior quality of our bananas according to the Auckland Agents, these same men are making contracts f.o.b. at 8s., 10s. 6d., and 13s. for four months at each price freely for this year."

It is regrettable that just at this time when bananas are plentiful and no steamers are taking fruit to Australia that banana space should have been cut down to enable sugar to be carried.

[In reference to the above, the Manager of the Union Steamship Company explains that the sugar was carried at the request of the New Zealand Government on account of a shortage in that country, and that banana shippers were notified of the reduction of the space, and, further, that a similar reduction in the banana space will be necessary in the case of the February sailing steamer.]

INSPECTION OF VESSELS.

The following list shows the numbers of vessels reported during January, 1920, for inspection under the Coconut Scale Regulations and the number of cases in which material had to be destroyed:—

	Port.	Vessels inspected.		Cases in which material was destroyed.
Suva		1		—
Levuka		73		38
Lautoka		7		3

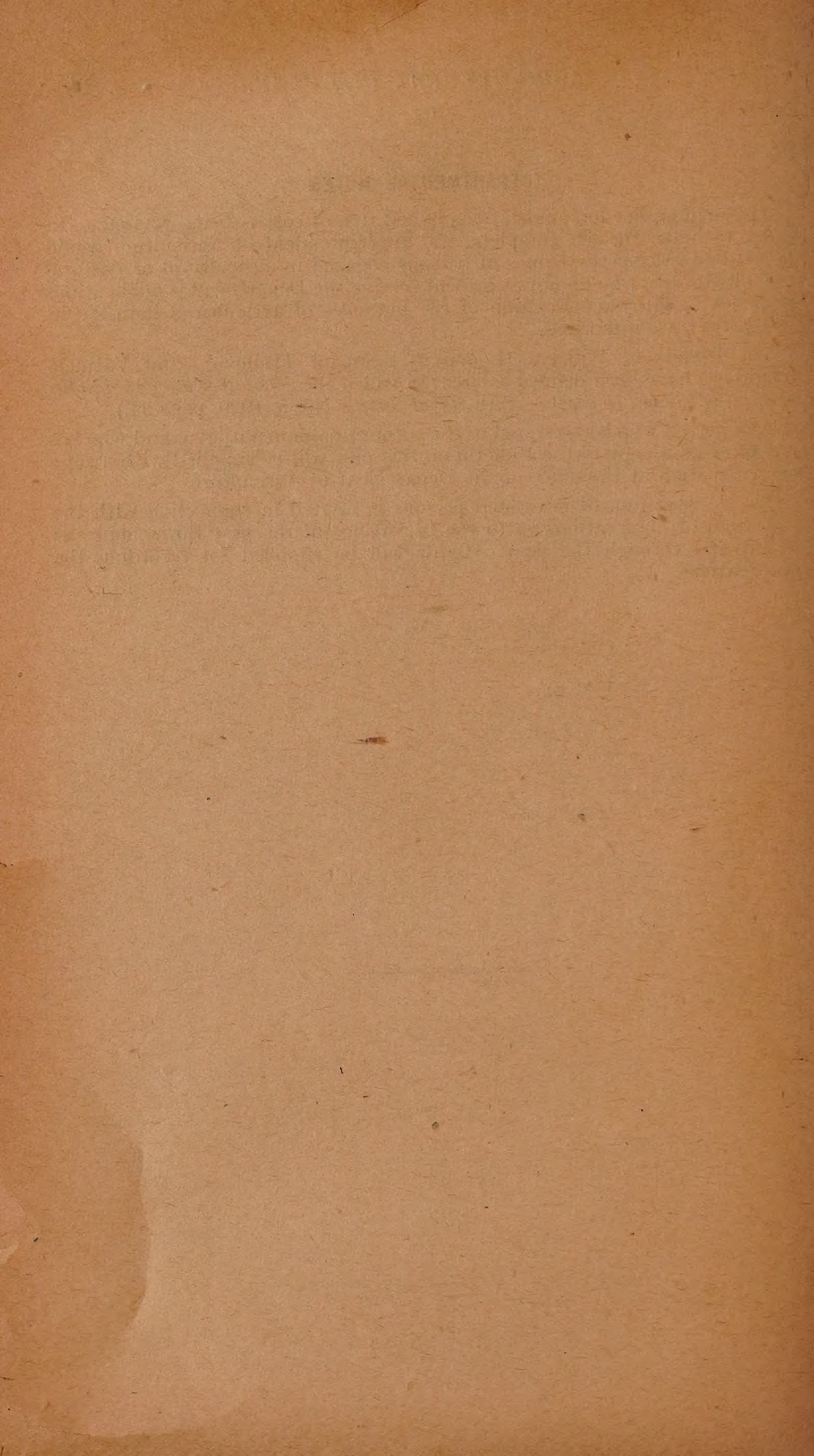
DEPARTMENTAL NOTES.

The mailing list for publications issued free of cost is being revised. In order to make the list complete, the Superintendent of Agriculture would be glad to receive the names of persons engaged in agricultural or pastoral pursuits in Fiji, who do not at present receive the Departmental publications referred to, with an indication of the branches of agricultural industry in which they are interested.

The islands of Wakaya (Lomaiviti), Nagani (Tailevu), and Vatulele (Nadroga) have been defined as areas in which the coconut scale (*Aspidiotus species*) is known to exist. (See *Royal Gazette* No. 5, 1920, page 34.)

Any person who is interested in the coconut palm in Vitilevu, and who has not received a copy of the Bulletin on this pest will be supplied with a copy on application at the office of the Department of Agriculture.

The co-operation of interested persons is invited in connection with the collection of observations as to the prevalence of the pest throughout the island and through the year. Cards will be supplied for recording the observations.



Agricultural Associations in Fiji.

THE COUNCIL OF PLANTERS OF FIJI.

Chairman.....MR. J. L. HUNT.

Vice-Chairman.....MR. E. DUNCAN.

Secretary and Treasurer.....MR. M. H. DART.

ASSOCIATED BODIES.

THE CAKAUDROVE COPRA GROWERS' ASSOCIATION.

THE CANE GROWERS' ASSOCIATION OF FIJI (BA AND NADI
BRANCHES.)

THE LABASA PLANTERS' ASSOCIATION.

THE SAVUSAVU PLANTERS' ASSOCIATION.

THE SOUTHERN DISTRICTS PLANTERS' ASSOCIATION.

CONTENTS.

	PAGE
EDITORIAL NOTES	15
THE DEVELOPMENT OF CATTLE PRODUCTION IN FIJI <i>by W. Rainey</i> ..	17
ECONOMY IN LABOUR ON THE PLANTATION <i>by the Superintendent of Agriculture</i>	20
REPORT ON THE VETERINARY INSPECTION AT MAKOGAI <i>by W. Rainey</i>	25
REPORT ON THE VETERINARY INSPECTION OF DAIRIES AND CATTLE, SUVA DISTRICT <i>by W. Rainey</i>	28
EXTRACTS FROM REPORTS OF INSPECTORS	33
DEPARTMENTAL NOTES	35